BLUE SWIMMING CRAB HATCHERY

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INTRODUCTION

The blue swimming crab *Portunus pelagicus* (Herbst) is one of the major marine crabs used for domestic consumption as well as for export. Presently, it is priced at Rs. 30-45/kg and during certain seasons, it goes upto Rs. 60-70/kg. The price is steadily increasing due to increased demand for export and decline in the landings.

As the severe and recurring disease outbreak in shrimp culture has resulted in heavy loss it is time to restrict the overemphasis given to shrimp culture and diversify the culture practices. Blue swimming crab *P. pelagicus* has proved to be a good candidate species for aquaculture.

The hatchery operation and rearing of this species is easier when compared to other crabs like *Scylla serrata*. The easy availability of ovigerous females of *P.pelagicus* at low prices is an important factor that makes the hatchery operation less cumbersome by avoiding the long procedure of broodstock maintenance.

BIOLOGY

P.pelagicus grows to a maximum size of 20 cm carapace width and about 550 gm in weight. It usually occurs in 10-15m depth. Smaller ones are available in shallower areas. Males and females exhibit distinct sexual dimorphism. The carapace of the male crab is brilliantly coloured with irregular white patches and tips of chelate and first walking legs are bright blue in colour. But female crabs are dull brown in colour with irregular white patches on the carapace and tips of chelate and walking legs are brown. They are free swimming crabs. The males grow larger and faster than females.

The species is carnivorous and feeds on fishes, shrimps, crabs and bivalves. Female crab attains sexual maturity at a size of about 10cm in carapace width. After spawning, female crabs carry the fertilized eggs in the pleopods. The incubation period is 10-12 days during which period the embryonic development is completed. The egg hatches out as zoea which metamorphoses through five zoeal stages and one megalopa stage before moulting into crab instar 1.

COLLECTION OF BROODSTOCK

Healthy ovigerous females of *P.pelagicus* with characteristic yellow coloured eggs are collected from the sea. The berried crabs are kept in 1.5t capacity tanks at a salinity of 35 ppt. pH 8.2 ± 0.1 and temperature 27 ± 2° C with continuous aeration.

Filtered sea water is used for the entire operation and 50% of water is exchanged every day. Fish and clam meat are given as food. The berried crab shows only occasional swimming behaviour in the tank by means of fifth pair of legs, but often stands on pereopods with the egg mass held above the substratum.

HATCHING OF THE ZOEAE

The changes in the egg colour are observed daily and when the egg mass becomes deep grey in colour, the animal is transferred into a separate tank. No feeding is required at this stage but tank must be cleaned and water exchanged daily till hatching.

The eggs hatch out during the early morning hours and the number of zoeae hatched out varies from 2 to 15 lakhs depending on the size of mother crab. Generally 100% hatching occurs. After hatching, the mother crab is removed from the tank and the number of larvae are counted.

LARVAL REARING

The zoeae are stocked in 5t tanks (preferably rectangular in shape) at a rate of 20,000-25,000/t. Zoeal stages I-V are reared in the same tank with a water exchange of 30% daily. Bottom sediments must be removed periodically. Zoeal phase (I–V) takes 12-14 days to metamorphose to megalopa. Each zoeal stage takes a minimum period of 2-3 days to moult. Zoeae are photopositive and active swimmers and very often they aggregate into groups along the sides of the tanks near the surface.

Megalopa takes 6-7 days to reach the crab stage. It is less active than zoea and swims by means of pleopods. It is cannibalistic in nature. So it is better to provide shelters like corrugated asbestos sheets or vertically hung polypropylene nets etc. Stocking density of larvae in the rearing tanks must be strictly managed as follows:-

Larval stage	Stocking density
Zoea I -V	20,000 - 25,000 / t
Megalopa	10,000 - 12,000 / t
Baby crab	5,000 - 7,000 / t

Larval feed

Zoea can be fed with mixed phytoplankton (dominated by *Chaetoceros* spp.) *Chlorella*, rotifer, *Moina* and *Artemia* nauplii. Use of *Artemia* will increase the feed cost. For megalopa, macerated shrimp meat and *Moina* are found to be the best. Clam meat and shrimp meat are suitable for feeding the crab instar. The feeding schedule for the larvae is given below:

Larval stage	Feed	Conc./ml	Ration / t / day
Zoea I	*Chlorella*	14-18 mill.	100 l
	Rotifer	350-400 no.	100 l
Zoea II	"	"	250 l
Zoea III	"	"	250 l +
Zoea IV	"	"	"
Zoea V	"	"	"
Megalopa	*Moina*	10-20 no.	100 l
Baby crab	*Moina* + Egg custard	"	100 l+ 50 g

Water Quality

The health and survival rate of the larvae are greatly influenced by the quality of water. The desirable ranges for the different parameters for the hatchery are: Salinity - 33.2 ppt; Temperature - 28.2°C; Oxygen - 4 - 6 ml/1; pH - 7.8-8.2; Ammonia - <0.1 ppm and Nitrate - <0.05 ppm

ECONOMICS

Since the culture of *Portunus pelagicus* is not practised in our country, a crab hatchery combined with an existing shrimp hatchery is advised. In order to produce one million baby crabs per year a shrimp hatchery 3-40 million can be used with a few additional facilities for live feed culture.

For a production of one million crab seeds seven hatchery runs have to be carried out with 1.5 lakhs per run (with a survival of 25% from zoea to crab stage). The operating cost for a single hatchery run is given below:

Operating Cost	Rs.
Mother crab (4 nos.) :	100.00
Chemicals for live feed culture (*Chlorella*, rotifier and *Moina*)	1200.00
Filter cloth (40µ. 100µ. 150µ, 250µ & 300µ)	15000.00
Fuel and Electricity charges	20000.00
Salary for the staff (Manager, Supervisors, technicians, helpers and watch & ward)	35000.00
Total Cost/crop	**71,300.00**
Annual operating cost (7 crops)	499,100.00
Annual Income (One Rupee per seed)	1050000.00
Net annual Income	**550,900.00**